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Corrected version: UM and ChromatoChem ready for scale-up phase in testing model for 'mining' Butte pit's water

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CORRECTED VERSION

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UM AND CHROMATOCHEM READY FOR SCALE-UP PHASE IN TESTING MODEL FOR 'MINING' BUTTE PIT'S WATER

By Janice Downey
UM News and Publications

In a laboratory demonstration, researchers at the University of Montana and a **Missoula** biotechnology firm have shown it's possible to remove toxic heavy metals from mine water. The results point to technology for purer water and profits to boot.

"We're still at the stage of asking the question, 'Is this really as good as it sounds?'" ChromatoChem Inc. President Richard Hammen says about his idea for extracting heavy metals from mine water. "It has a couple of nice possibilities."

With some biotechnology from ChromatoChem and $10,000 from UM's research administration, Hammen and his associates joined UM researchers in the project.

"The cooperative research with ChromatoChem is an outstanding opportunity for the University of Montana," says Ray Murray, UM vice president for research. "The university has invested in this project as part of our contribution to develop partnerships with Montana biotech industries."

The UM researchers are microbiology Associate Professor Ralph Judd, geology Professor Johnnie Moore, chemistry Professor

- more -

Ed Waali and research assistant Joan Szuba. They aim to use the technology on Berkeley Pit water in **Butte**.

Loaded with metals from aluminum to zinc, water in the huge pit on Butte's Eastside threatens to poison water for the Mining City and the **Clark Fork Basin**.

"It's a very dangerous situation," Judd says. "We feel we've got at least an attempt or first step at solving the problem."

Since 1982 when Atlantic Richfield Co. suspended mining operations in Butte, the pit has been filling with groundwater. At the rate the pit's water is rising, the water level could reach the area's aquifer by 1995, says Marvin Miller, chief of the hydrology division for the Montana Bureau of Mines.

Situated at the base of the Continental Divide, Butte is at the headwaters of the Clark Fork--water that flows into the Pacific Ocean. If allowed to flow untreated, the contaminated water would destroy the ecosystem in Clark Fork Basin and farther downstream, Miller says.

"It's really a serious concern," says Don Peoples, chief executive of Butte-Silver Bow. "But I think there are ways to control it. There's also some potential opportunity here to recover some of the heavy metals that are in the water."

Other researchers are looking for ways to turn the water into a mining resource. Averting the environmental crisis could pay off handsomely, Hammen says, because the pit contains more

than $2 billion worth of dissolved metals.

To separate the heavy metals from the pit water, the researchers propose pumping water into the top of column-shaped filter units about 20 feet high and 15 feet across. These silo-shaped columns contain special beads covered with claw-like molecules that selectively grab metals in the water.

Metal-free water comes out the bottom of the columns, their research shows, and the metals stay inside the columns in concentrations 10-20 times those in the pit's water. To remove the metals and make the filters re-useable, the filters are flushed with sulfuric acid. Acid in the columns is neutralized with lime, and the cycle is repeated.

"It works very effectively on our demonstration-level projects here at the university where we have done this on a benchtop scale," Judd says.

In UM and ChromatoChem's lab experiments, the researchers also tested the capacity of materials needed in removing the metals and the durability of the materials to be used hundreds of times, needed for making the operation economically feasible.

Encouraged by the results, the researchers are now ready to create a larger demonstration model and are looking for the means of scaling up. Judd says the researchers are seeking public or private sources for development dollars necessary for hiring full-time researchers and building the working model.

Since Butte is a Superfund site, the U.S. Environmental

Protection Agency Superfund is one possible source for developing the project, the Montana Science and Technology Alliance another.

Peoples has commissioned scientists from Montana Tech, the Bureau of Mines and Butte community to study the problem and evaluate potential solutions. That team could also lend technical support for the venture. Although more research is necessary, Peoples says the UM and ChromatoChem researchers may have the technology that'll work.

The technology could be used anywhere water leaches metals out of tailings and carries them into water systems, says Hammen, who's seeking a patent on ChromatoChem's technology used in the project.

"I see it as a world-wide application for that technology," he says, "and in particular with the Milltown Dam" on the Clark Fork near Missoula. The researchers showed that arsenic, a major pollutant at the dam, could be removed in the treatment cycle.

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Local, dailies, media in Butte, Anaconda and along the Clark Fork, Montanan/pics to newspapers
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